

TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
NRT.0031US

In Re Application Of: David W. Paranchych et al.

Serial No.
09/696,491Filing Date
10/25/2000Examiner
D. Q. NguyenGroup Art Unit
2681

Invention: PERFORMING POWER CONTROL IN A MOBILE COMMUNICATIONS SYSTEM

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3/24/04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: David W. Paranchych et al §
Serial No.: 09/696,491 §
Filed: October 25, 2000 §
For: PERFORMING POWER §
CONTROL IN A MOBILE §
COMMUNICATIONS SYSTEM §



Group Art Unit: 2681
Examiner: D. Q. Nguyen
Atty. Dkt. No.: NRT.0031US
(10955RRUS02U)

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APPEAL BRIEF

Sir:

Applicant respectfully appeals from the final rejection mailed October 3, 2003.

I. REAL PARTY IN INTEREST

The real party in interest is Nortel Networks Limited, the assignee of the present application by virtue of the assignment recorded at Reel/Frame 011268/0279.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF THE CLAIMS

Claims 2-4, 6-24, 26, 28, and 30-36 have been finally rejected and are the subject of this appeal.

IV. STATUS OF AMENDMENTS

No amendments were submitted after the final rejections.

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V. SUMMARY OF THE INVENTION

In accordance with some embodiments of the invention, power control, such as outer-loop power control in a CDMA system, can continue to be performed even though transmission of traffic frames in a wireless link between the mobile unit and base station has been discontinued during discontinuous transmission (DTX) mode. Although traffic signaling is discontinued on some traffic channels in DTX mode, control signaling with a known pattern may still be transmitted. Such control signaling may be monitored to detect for errors so that appropriate power control may be performed. In one embodiment, the power control includes adjusting a power control element such as the target ratio of energy per bit to noise spectral density (Eb/No). As used here, a "power control element" refers to any element (e.g., parameter, component, etc.) that can be adjusted to affect the transmission power of signals in wireless links between mobile units and base stations. Specification, p. 4, ll. 8-19.

As shown in Fig. 1 of the specification, a mobile communications system 10 includes a plurality of cell segments 12. As a mobile unit 16 crosses from one cell segment 12 to another cell segment, a hand-off procedure is performed by the base stations. For example, CDMA provides for a soft hand-off procedure in which a mobile unit is directed to hand-off to the same frequency and is assigned to an adjacent cell or sector without dropping the original radio frequency (RF) link. During the soft hand-off process, the mobile unit may keep two or more RF links active. In a CDMA system, a RF link refers to a link associated with a given pseudorandom noise (PN) code. CDMA systems also perform softer hand-offs in which mobile units perform hand-offs within different sectors of the same cell site. Specification, p. 4, l. 20-p. 5, l. 6.

The air link between each base station 14 and each mobile unit 16 includes a forward link 22 (from the base station to the mobile unit) and a reverse link 24 (from the mobile unit to the

base station). According to CDMA 2000, the reverse link 24 includes a pilot channel, a power control subchannel, a traffic channel, and other channels. The traffic channel may include a dedicated control channel (DCCH), fundamental channel (FCH), supplemental channel (SCH), and other channels. The DCCH and SCH in the traffic channel are fixed-rate channels on which DTX mode is available. During DTX mode, the fixed-rate channels in the reverse link 24 are not transmitted to preserve power and to reduce interference. However, transmission of the pilot channel and power control subchannel in the reverse link 24 continues. Specification, p. 5, ll.

15-24.

The pilot channel in the reverse link 24 (also referred to as a reverse pilot channel) is an unmodulated, direct-sequence spread spectrum signal transmitted continuously by a mobile unit. A reverse pilot channel provides a phase reference for coherent demodulation and may provide a mechanism for signal strength measurement. The reverse power control subchannel is a subchannel on the reverse pilot channel used by the mobile unit to control the power of a base station when operating under certain configurations. Specification, p. 5, ll. 25-31.

The reverse DCCH is a portion of the reverse traffic channel used in some configurations for the transmission of higher-level data and control information from a mobile unit to a base station. The reverse FCH is also a portion of the reverse traffic channel that carries higher-level data and control information from a mobile unit to a base station. A reverse SCH is a portion of the traffic channel, which operates in conjunction with a reverse FCH or reverse DCCH to provide higher data rate services and on which higher-level data is transmitted. In the forward link 22, the forward traffic channel may also include a forward DCCH, a forward FCH, and a forward SCH. Specification, p. 6, ll. 1-8.

During active communications of traffic channels between the base station and mobile unit, the base station monitors for occurrence of frame errors in one or more of the reverse DCCH, reverse FCH, and reverse SCH to adjust the target Eb/No in the base station, and the mobile unit monitors one or more of the forward DCCH, forward FCH, and forward SCH to adjust the target Eb/No in the mobile unit. The target Eb/No values determine the frame error rate (FER) on the corresponding channel. Specification, p. 6, ll. 9-14.

However, when the mobile unit enters DTX mode, the transmitter in the mobile unit 16 can cease transmission of DCCH and SCH traffic frames without warning the base station 14. As a result, the base station 14 is not notified explicitly when transmission of traffic frames has stopped. This results in an outer-loop power control problem, especially if fast power control is being employed. Specification, p. 6, ll. 15-19.

Once traffic frames stop, conventional techniques of detecting for errors in the reception of traffic frames is not available. As a result, the ratio of energy per bit to noise spectral density (Eb/No) cannot be accurately adjusted by conventional techniques during this period of traffic silence. Typically, the target Eb/No is increased when data is received in error and decreased when data is received correctly. An increase in the target Eb/No results in reduced capacity in a cell due to the likelihood of enhanced interference between mobile units. On the other hand, a decrease in the target Eb/No (and thus transmission power) increases the likelihood that the call may be dropped. To achieve proper outer-loop power control to avoid these issues, in accordance with some embodiments, control signaling instead of the traffic signaling is used to perform adjustment of the target Eb/No value. Also, to enable outer-loop power control based on the control signaling instead of traffic signaling, a mechanism is provided to detect that a mobile unit has entered DTX mode. Specification, p.6, l. 20-p. 7, l. 2.

In further embodiments, the base station 14 can also enter DTX mode, in which case adjustment of Eb/No by the mobile unit is also based on control signaling rather than traffic channels. Specification, p. 7, ll. 3-5.

Fig. 3 of the specification shows the procedure performed by the base station 14 by which outer-loop power control is performed. In further embodiments, the same process or some modified form of the process may be performed by the mobile unit 16. The power control routine first detects (at 202) if the mobile unit is in DTX mode. If not, then conventional power control may be performed, in which traffic channels in the reverse link are monitored (at 204) to determine the FER. Based on the determined FER, the target Eb/No ratio is adjusted (at 206). The target Eb/No is increased if the FER rises above a threshold and is decreased if the FER falls below the threshold. Alternatively, outer loop power control may be driven by the occurrence of frame errors rather than by the FER crossing a threshold. Specification, p. 7, l. 29-p. 8, l. 7.

However, if the power control routine determines (at 202) that the mobile unit is in DTX mode, then the base station 14 checks (at 208) for errors in bits received on the pilot channel. As shown in Fig. 4A, on the reverse link according to IS-2000, a power control group 300 includes a power control subchannel 304 that is time multiplexed with a pilot channel 302, with the two transmitted at the same power level. In the power control group 300, the first three-quarters of each interval is allocated to the pilot channel 302, while the last quarter is devoted to the power control subchannel 304. An interval (the length of the power control group 300) in one embodiment is typically about 1.25 milliseconds (ms). The polarity of the power control subchannel 304 is unknown, but the polarity of the pilot channel 302 is known. Therefore, in addition to its role in the recovery of the channel phase and gain, the pilot channel 302 may be

used by the base station to detect the BER of the pilot channel 302 (or equivalently, the power control subchannel 304, since the two are sent at the same power). Specification, p. 8, ll. 8-20.

The predetermined information in the pilot channel 302 includes known values (all ones in one embodiment). If any of the received bits is not at the expected state, then a bit error is recorded (at 210). Each base station 14 performs error detection in pilot channel bits for each mobile unit 16 (in DTX mode) that the base station 14 is communicating with. The same mobile unit may communicate with multiple base stations 14 due to the possibility of soft hand-off. Thus, for any given mobile unit 16, plural base stations 14 may be performing the tasks described in Fig. 3 of the specification. Specification, p. 8, ll. 21-31.

The power control tasks performed in the base station 14, as illustrated in Fig. 3, may also be performed by the mobile unit 16. If the base station 14 enters DTX mode, the control signaling may be monitored to detect for errors. In one example, a user dedicated pilot channel may be defined in the forward link to enable outer loop power control during DTX mode of the base station 14. However, other control signals from the base station 14 may be used, provided such control signals have a known state. Specification, p. 9, ll. 1-5.

The detection and comparison acts at 208 and 210 may be performed in one of several ways. In one embodiment, a fixed number of bits in the pilot channel may be observed in a given time interval. The BER is then computed for that time window. A storage register that records the result of a prior comparison may be cleared in preparation for the accumulation of bit errors in a disjoint time window. In another embodiment, a “sliding window” may be used in which the last N bits in the pilot channel are stored and the BER is updated with the arrival of each new pilot bit measurement. In further embodiments, other methods may be used to derive the BER from the sequence of pilot bit errors. Specification, p. 9, ll. 8-16.

Based on the detection of error or lack thereof, the power control routine in the base station adjusts (at 212) the target Eb/No, once per frame interval. The target Eb/No is increased if the BER reported on each link is greater than the threshold value and decreased if one of them is lower than the threshold value. An “excessive BER event” is one in which the measured BER of a link is larger than the BER threshold. The up and down step sizes of the target Eb/No are derived from a desired probability of an excessive BER event in the same way that the step sizes are derived from the target FER in normal IS-2000 operation. Once the mobile unit comes out of DTX mode, the target Eb/No value that has been updated in the base station is used to generate (at 214) power control commands for the mobile unit, which are communicated to the mobile unit. The power control commands from the base station to the mobile unit controls the output power of the transmitter in the mobile unit. Specification, p. 9, ll. 17-28.

In the illustrated embodiment of Fig. 3, bit errors in the pilot channel are used to adjust the target Eb/No during DTX mode, but normal detection of traffic frame errors is used during non-DTX mode (i.e., during active transmission of traffic frames from the mobile unit to the base station). In another embodiment, the bit errors in the pilot channel can be used to perform adjustment of the target Eb/No whether the mobile unit 16 is in DTX mode or not. Specification, p. 9, l. 29-p. 10, l. 5.

By using some embodiments of the invention, more effective power management is provided in each mobile unit. Adjustment of the Eb/No value during periods of traffic silence allows for reduction in power levels (and thereby increase the battery life of a mobile unit) while ensuring reliable communications due to traffic patterns and conditions after the mobile unit exits DTX mode and traffic signaling is started again. Although described in conjunction with the DTX mode of a mobile unit, the procedure described may be used for the base station if it is

capable of entering DTX mode or some mode in which the base station stops sending traffic signaling. In further embodiments, the mobile communications system 10 may be a system other than a CDMA or CDMA 2000 system. Specification, p. 11, ll. 7-16.

Although several embodiments have been described above, other embodiments are also covered by the claims on appeal.

VI. ISSUES

- A. Does The Asserted Combination Of Hamalainen And Weaver Render Claims 2, 4, 9-18, And 30-32 Obvious?**
- B. Does The Asserted Combination Of Hamalainen And Weaver Render Claims 33-36 Obvious?**
- C. Does The Asserted Combination Of Hamalainen And Willenegger Render Claims 20-22 And 26 Obvious?**
- D. Does The Asserted Combination Of Hamalainen And Weaver Render Claims 7 and 8 Obvious?**
- E. Does The Asserted Combination Of Hamalainen, Weaver, And "Admitted Prior Art" Render Claim 19 Obvious?**
- F. Do The Asserted Combinations Of Hamalainen And Other References Render Claims 3, 6, 23, 24, And 28 Obvious?**

VII. GROUPING OF THE CLAIMS

Group 1: Claims 2, 4, 9-18, 30-32.

Group 2: Claims 33-36.

Group 3: Claims 20-22, 26.

Group 4: Claims 7, 8.

Within each group, the claims stand and fall together. Claims 3, 6, 19, 23, 24, and 28 are not part of any group.

VIII. ARGUMENT

All claims should be allowed over the cited references for the reasons set forth below.

A. Does The Asserted Combination Of Hamalainen And Weaver Render Claims 2, 4, 9-18, And 30-32 Obvious?

Independent claim 4 was rejected over the asserted combination of Hamalainen and Weaver. To establish a *prima facie* case of obviousness, one requirement is that the references when combined must teach or suggest *all* claim limitations. M.P.E.P. § 2143.01 (8th ed., Rev. 1) at 2100-125. The Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 4 over the asserted combination of Hamalainen and Weaver.

Claim 4 recites detecting an error in control signaling transmitted over a link between a base station and a mobile unit when traffic channels are not being communicated. The Examiner cited to page 7, lines 3-7, the Abstract, and Figures 1-3 of Hamalainen as teaching the detecting act of claim 1. 10/03/03 Office Action at 2. Page 7 of Hamalainen, at lines 3-7, refers to a personal station not sending any information in the reverse channel during DTX state. The Abstract of Hamalainen describes lowering the frequency of power control commands or changing the energy of power control bits in response to detecting that traffic has become slower in a given direction (due to a DTX state, a slower transfer rate, asymmetric data transfer or for any other reason). There is nothing in any of the cited passages that even remotely suggests *detecting an error in control signaling* transmitted over a link between the base station and the mobile unit when traffic channels are not being communicated. In fact, nowhere within Hamalainen is there any teaching of *detecting for errors in control signaling*.

In the Advisory Action dated December 24, 2003, the Examiner further argued that because the personal station is in a DTX state (as indicated on page 7, lines 3-7 and Fig. 3 of Hamalainen), that its information rate is low and the channel's transmission power requirement

and its reception power are low. The Examiner continued to state that "[i]t is apparent that in the DTX state, the system detects BTS' information rate is low, the channel's transmission power is required and BTS' reception power are low. Moreover, in the DTX state traffic channels are not being communicated as Hamalainen teaches the personal [station] sends no information to the BTS. *Therefore, Hamalainen teaches detecting an error in control signaling transmitted over a link between the base station and the mobile unit when traffic channels are not being communicated.*" 12/24/03 Advisory Action at 2 (emphasis added). The last sentence of the statement made by the Examiner has no support whatsoever in Hamalainen. Just because the personal station is in DTX mode does *not* necessarily mean that detection of error in control signaling is being performed. In fact, no such specific teaching, or any suggestion whatsoever, is provided by Hamalainen. All Hamalainen is concerned with is reducing the frequency of power control commands between a personal station and a base station when DTX mode is present. There is no teaching, contrary to the assertion made by the Examiner, of detecting an error in control signaling.

Nor is there any teaching or suggestion anywhere within Hamalainen of adjusting a power control element based on the detected error *in the control signaling*. The Examiner cited to the Abstract and page 9, lines 23-33, of Hamalainen as teaching the adjusting act of claim 4. 10/03/03 Office Action at 2. What the cited passages of Hamalainen describe is either changing the frequency of power control commands, or reducing the energy of such power control commands, in response to detecting a reduced data transfer rate in a given direction. There is absolutely no suggestion or hint in the cited passages, or anywhere else in Hamalainen, of adjusting a power control element based on *detected error in control signaling*.

In view of the foregoing, Hamalainen fails to teach or suggest *any* of the elements of claim 4 stated by the Examiner as being disclosed by Hamalainen. Thus, even if Hamalainen can be properly combined with Weaver, the hypothetical combination of Hamalainen and Weaver fails to teach or suggest *all* elements of claim 4. Therefore, a *prima facie* case of obviousness has not been established with respect to claim 4 for at least this reason.

The obviousness rejection over Hamalainen and Weaver is further defective for the reason that Weaver also fails to teach or suggest any of the elements of claim 4. The Examiner asserted that Weaver discloses "adjusting a ratio of energy per bit to noise spectral density based on the detected error of voice data and reverse link (*see col. 3, lines 45-65 and col. 4, lines 29-33*)." 10/3/03 Office Action at 2. The Examiner then proceeded to cite to *Applicant's disclosure of the invention* to support the assertion that Weaver teaches the adjusting act recited in claim 4.

The use of Applicant's disclosure of the invention is improper. It is apparent that there is nothing within Weaver to even remotely suggest the elements of the claim. Rather than find objective proof in prior art references to support the allegation of obviousness, the Examiner instead relies on Applicant's description of some embodiments of the invention in an attempt to modify Weaver to support the obviousness rejection. Applicant's description of some embodiments of the invention is *not* a proper source of prior art--therefore, the obviousness rejection is improper and should be withdrawn.

Moreover, a careful review of Weaver will reveal that Weaver does *not* disclose adjusting a target ratio of energy per bit to noise spectral density *based on detected error in control signaling*. Weaver expressly teaches an inner control loop that detects the Eb/No of propagated *voice data* and adjusts the power output level of a reverse link transmitter 102 to increase or decrease the Eb/No of propagated voice data to match the Eb/No target 214. Thus, the Eb/No

adjustment taught by Weaver is based on *voice data*, not *control signaling*. See Weaver, 3:46-48. Weaver is completely silent on adjusting a target Eb/No based on detected error in control signaling.

For at least this further reason, the hypothetical combination of Hamalainen and Weaver fails to teach or suggest all elements of claim 4. Therefore, the *prima facie* case of obviousness is defective for this further reason.

Independent claim 30 was also rejected over the asserted combination of Hamalainen and Weaver. With respect to independent claim 30, there is no teaching or suggestion anywhere within Hamalainen or Weaver of detecting for one or more *errors in control signaling* received over a link, and adjusting a power control element based on the detected one or more *errors in the control signaling* if the mobile unit is in a discontinuous transmission mode. Therefore, a *prima facie* case of obviousness has also not been established with respect to independent claim 30.

In view of the foregoing, it is respectfully requested that the final rejection of claims 2, 4, 9-18, and 30-32 be reversed.

B. Does The Asserted Combination Of Hamalainen And Weaver Render Claims 33-36 Obvious?

Independent claim 33 was rejected over the asserted combination of Hamalainen and Weaver. The Examiner incorrectly asserted that Hamalainen discloses the monitoring of one or more errors in receiving predetermined *pilot signal information* when traffic signaling is not being transmitted. As noted above, there is no teaching whatsoever of monitoring for errors in control signaling when traffic is not being transmitted. There is also no suggestion by Hamalainen of monitoring errors in received predetermined *pilot signal information*. Thus, the

obviousness rejection of claim 33 is also clearly defective, since Hamalainen does not teach an element of the claim 33 that the Examiner asserts is disclosed by Hamalainen. For at least this reason, a *prima facie* case of obviousness has not been established with respect to claim 33, as the hypothetical combination of Hamalainen and Weaver does not teach or suggest all elements of claim 33.

Also, the inner control loop described in column 3, line 58 to column 4, line 6 of Weaver teaches the detection of Eb/No of propagated *voice data*, and adjusting the power output level to increase or decrease the Eb/No of propagated voice data to match a target Eb/No. There is absolutely no mention or hint whatsoever in the cited passages of Weaver of adjusting a target ratio of energy per bit to noise spectral density based on monitored one or more errors in *pilot* signal information. For this additional reason, the hypothetical combination of references does not teach or suggest all elements of claim 33.

For the reasons above, the final rejection of claims 33-36 should be reversed.

C. Does The Asserted Combination Of Hamalainen And Willenegger Render Claims 20-22 and 26 Obvious?

Independent claim 20 was rejected over the asserted combination of Hamalainen and Willenegger. Again, the Examiner has failed to establish a *prima facie* case of obviousness with respect to this claim over the asserted combination of references.

As noted, Hamalainen does not disclose detecting for error in received control signaling and adjusting a power control condition based on a detected error in the received control signaling in response to detecting that the mobile unit is in a discontinuous transmission mode. Because of this defect, the hypothetical combination of Hamalainen and Willenegger cannot

teach or suggest all claim elements. Therefore, a *prima facie* case of obviousness has not been established with respect to the claim for at least this reason.

Moreover, contrary to the assertion in the Office Action, Willenegger does not disclose detecting for error in traffic signaling from a mobile unit and to adjust a power control condition based on detected error in the traffic signaling in response to the detecting that a mobile unit is not in discontinuous transmission mode. Willenegger actually teaches away from this feature, as it states that the power control command 121 is based on the energy of a pilot channel, *rather than the traffic channel*. Willenegger, 6:17-18. Willenegger states that a more accurate power control command is generated in this way because the pilot channel is transmitted with a relatively constant or slow changing transmit power. Willenegger, 6:17-20. Thus, Willenegger teaches that generating a power control command based on a traffic channel is *not desirable*.

Also, Willenegger fails to disclose or suggest detecting whether a mobile unit is or is not in discontinuous transmission mode. Therefore, it is impossible for Willenegger to adjust the power control condition based on detected error in the traffic signaling in response to *detecting that the mobile unit is not in the discontinuous transmission mode*.

For this further reason, the hypothetical combination of Hamalainen and Willenegger fails to teach or suggest all elements of claim 20.

Moreover, as discussed above, Willenegger teaches away from the feature of claim 20 that recites adjusting a power control condition based on detected error in traffic signaling in response to detecting that a mobile unit is not in discontinuance transmission mode. Because Willenegger teaches away from this feature of claim 20, there is no motivation or suggestion to combine Hamalainen and Willenegger. As stated by the MPEP, another requirement of a *prima facie* case of obviousness is that there must be a suggestion or motivation to combine reference

teaches. See M.P.E.P. § 2143.01 at 2100-124 to 2100-125. “A reference that ‘teaches away’ from the invention is a significant factor to be considered in determining obviousness.” *Id.*, § 2143.01 at 2100-156. The teachings of Willenegger would have lead a person of ordinary skill in the art away from the claimed invention—therefore, no motivation or suggestion exists to combine Hamalainen and Willenegger in the manner proposed by the Examiner.

For the reasons set above, the final rejection of claims 20-22 and 26 should be reversed.

D. Does The Asserted Combination Of Hamalainen And Weaver Render Claims 7 and 8 Obvious?

Claims 7 and 8 depend from claim 4, and thus are allowable over the asserted combination of Hamalainen and Weaver for at least the same reasons as claim 4. Furthermore, the hypothetical combination of Hamalainen and Weaver fails to teach or suggest detecting an error in a given number of samples of control signaling. The Examiner cited to column 3, lines 45-52 of Weaver as teaching this particular feature. 10/03/03 Office Action at 5. However, this cited passage of Weaver refers to detecting error of propagated *voice data* received by a base station. No mention is made of detecting error in a given number of *samples of control signaling*. Also, no teaching or suggestion is made in the hypothetical combination of Hamalainen and Weaver of detecting an error in a given number of bits of control signaling (as recited in dependent claim 8).

In view of the foregoing, a *prima facie* case of obviousness has not been established with respect to dependent claims 7 and 8. Therefore, the final rejection of claims 7 and 8 should be reversed.

E. Does The Asserted Combination Of Hamalainen, Weaver, And "Admitted Prior Art" Render Claim 19 Obvious?

Claim 19 (which depends from claim 15, which in turn depends from claim 4) was rejected over the asserted combination of Hamalainen, Weaver, and "Admitted Prior Art." As noted above, Hamalainen and Weaver do not teach or suggest elements recited in base claim 4. Therefore, the obviousness rejection of claim 19 over Hamalainen, Weaver, and "Admitted Prior Art" is also defective.

Furthermore, the asserted combination of references fails to teach or suggest adjusting a power control element according to one technique in discontinuous transmission mode, and according to another technique when not in discontinuous transmission mode. This selectivity clearly is not taught or suggested by any of the references. Although the Background section of the present application refers to adjusting a target ratio of energy per bit to noise spectral density based on errors in receiving traffic frames, there is no suggestion there of performing the adjustment of a power control element according to two techniques based on whether or not a mobile unit is in discontinuous transmission mode. Therefore, the hypothetical combination of Hamalainen, Weaver, and "Admitted Prior Art" does not render claim 19 obvious.

It is respectfully requested that the final rejection of claim 19 be reversed.

F. Do The Asserted Combinations Of Hamalainen And Other References Render Claims 3, 6, 23, 24, And 28 Obvious?

Claim 3 (which depends from claim 4) was rejected over the asserted combination of Hamalainen, Weaver, and Willenegger. This obviousness rejection is defective for at least the reason that the rejection of base claim 4 over Hamalainen and Weaver is defective. Moreover, as noted above, because Willenegger teaches away from the claimed invention, no motivation or suggestion exists to combine Hamalainen, Weaver, and Willenegger in the manner proposed by

the Examiner. A *prima facie* case of obviousness has thus not been established with respect to claim 3.

Claim 6 (which depends from claim 4) was rejected over the asserted combination of Hamalainen, Weaver, and Chen. This obviousness rejection is defective for at least the reason that the rejection of base claim 4 over Hamalainen and Weaver is defective.

Claim 23 (which indirectly depends from claim 20) was rejected over the asserted combination of Hamalainen, Willenegger, and Chen. Also, claim 24 (which depends from claim 20) was rejected over the asserted combination of Hamalainen, Willenegger, and “Admitted Prior Art,” and claim 28 (which depends from claim 20) was rejected over the asserted combination of Hamalainen, Willenegger, and Weaver. These obviousness rejections are defective for at least the reason that the rejection of base claim 20 over Hamalainen and Willenegger is defective. Moreover, as noted above, because Willenegger teaches away from the claimed invention, no motivation or suggestion exists to combine Hamalainen, Willenegger, and Chen or “Admitted Prior Art” or Weaver in the manner proposed by the Examiner. A *prima facie* case of obviousness has thus not been established with respect to claims 23, 24, and 28.

In view of the foregoing, the final rejections of claims 3, 6, 23, 24, and 28 should be reversed.

IX. CONCLUSION

Applicant respectfully requests that each of the final rejections be reversed and that the claims subject to this appeal be allowed to issue.

Respectfully submitted,

Date: Mar. 8, 2004


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CLAIMS ON APPEAL

1 2. The method of claim 4, wherein detecting the error occurs during a
2 discontinuous transmission mode.

1 3. The method of claim 4, further comprising receiving a pilot channel from
2 the mobile unit over the link, the control signaling comprising the pilot channel.

1 4. A method of performing power control in a mobile communications
2 system having a base station and a mobile unit, comprising:

3 detecting an error in control signaling transmitted over a link between the
4 base station and the mobile unit when traffic channels are not being communicated; and

5 adjusting a power control element based on the detected error,

6 wherein adjusting the power control element comprises adjusting a target
7 ratio of energy per bit to noise spectral density based on the detected error in the control
8 signaling.

1 6. The method of claim 4, wherein detecting the error comprises detecting an
2 error in the control signaling over a given period of time.

1 7. The method of claim 4, wherein detecting the error comprises detecting an
2 error in a given number of samples of the control signaling.

1 8. The method of claim 7, wherein detecting the error comprises detecting an
2 error in a given number of bits of the control signaling.

1 9. The method of claim 4, further comprising communicating a power
2 control command based on the power control element to affect transmission power of the
3 mobile unit.

1 10. The method of claim 4, wherein detecting the error comprises detecting a
2 bit error rate.

1 11. The method of claim 4, further comprising receiving the control signaling
2 over a reverse link.

1 12. The method of claim 4, further comprising receiving the control signaling
2 over a forward link.

1 13. The method of claim 4, further comprising receiving the control signaling
2 over a link according to a code-division multiple access protocol.

1 14. The method of claim 4, further comprising detecting that the base station
2 is in discontinuous transmission mode, wherein detecting the error and adjusting the
3 power control element are performed while the base station is in the discontinuous
4 transmission mode.

1 15. The method of claim 4, further comprising detecting that the mobile unit is
2 in a discontinuous transmission mode, wherein detecting the error and adjusting the
3 power control element are performed while the mobile unit is in the discontinuous
4 transmission mode.

1 16. The method of claim 15, wherein detecting that the mobile unit is in
2 discontinuous transmission mode comprises detecting a power level of a traffic channel
3 transmitted by the mobile unit.

1 17. The method of claim 15, wherein detecting that the mobile unit is in
2 discontinuous transmission mode comprises detecting a state of a predetermined
3 information field.

1 18. The method of claim 17, wherein the information field comprises one or
2 more power control bits of a data frame transmitted by the mobile unit.

1 19. The method of claim 15, wherein adjusting the power control element is
2 based on the detected error if the mobile unit is detected to be in the discontinuous
3 transmission mode, the method further comprising adjusting the power control element
4 based on a frame error rate of traffic channels when the mobile unit is detected to be not
5 in discontinuous transmission mode.

1 20. A system for use in a mobile communications system, comprising:
2 a receiver to receive control signaling and traffic signaling from a mobile
3 unit; and

4 a controller to:
5 detect whether the mobile unit is in discontinuous transmission
6 mode,

7 detect for error in the received control signaling from the mobile
8 unit and to adjust a power control condition based on detected error in the received
9 control signaling in response to detecting that the mobile unit is in the discontinuous
10 transmission mode, and

11 detect for error in the traffic signaling from the mobile unit and to
12 adjust the power control condition based on detected error in the traffic signaling in
13 response to detecting that the mobile unit is not in the discontinuous transmission mode.

1 21. The system of claim 20, wherein the control signaling comprises a pilot
2 channel.

1 22. The system of claim 21, wherein the receiver is adapted to receive code-
2 division multiple access control signaling.

1 23. The system of claim 22, wherein the receiver is adapted to receive IS-2000
2 control signaling.

1 24. The system of claim 20, wherein the traffic signaling is not transmitted
2 during discontinuous transmission mode.

1 26. The system of claim 20, wherein the control and traffic signaling are
2 communicated in a reverse link between the mobile unit and a base station.

1 28. The system of claim 20, wherein the power control condition comprises a
2 target ratio of energy per bit to noise spectral density.

1 30. An article comprising one or more machine-readable storage media
2 containing instructions for performing tasks in a mobile communications system, the
3 mobile communications system having a mobile unit, a base station, and a link between
4 the mobile unit and base station, the instructions when executed causing a controller to:
5 determine whether the mobile unit is in discontinuous transmission mode;
6 detect for one or more errors in control signaling received over the link;
7 adjust a power control element based on the detected one or more errors in
8 the control signaling if the mobile unit is in the discontinuous transmission mode;
9 detect for one or more errors in traffic signaling received over the link;
10 and
11 adjust the power control element based on the detected one or more errors
12 in the control signaling if the mobile unit is not in the discontinuous transmission mode.

1 31. The article of claim 30, wherein the one or more storage media contain
2 instructions that when executed cause the controller to increase a target ratio of energy
3 per bit to noise spectral density if an error rate exceeds a threshold.

1 32. The article of claim 31, wherein the one or more storage media contain
2 instructions that when executed cause the controller to decrease the target ratio if the
3 error rate does not exceed the threshold.

1 33. A data signal embodied in a carrier wave comprising one or more code
2 segments containing instructions for performing tasks in a mobile communications
3 system, the instructions when executed causing a controller to:

4 monitor one or more errors in receiving predetermined pilot signal
5 information when traffic signaling is not being transmitted; and

6 perform outer loop power control based on the monitored one or more
7 errors, wherein performing the outer loop power control comprises adjusting a target ratio
8 of energy per bit to noise spectral density based on the monitored one or more errors in
9 the predetermined pilot signal information.

1 34. The data signal of claim 33, wherein the instructions when executed
2 further cause the controller to further detect that a system has entered into a discontinuous
3 transmission mode.

1 35. The data signal of claim 34, wherein the system comprises a mobile unit.

1 36. The data signal of claim 34, wherein the system comprises a base station.